CLAIMS

What is claimed is:

1   1.   A method for improving detection of a watermark, comprising:

2   generating a pseudo-random sequence of numbers based on data associated with a

3 data set;

4   producing the watermark based on the pseudo-random number sequence; and

5   embedding the watermark into the data set.

1   2.   The method of claim 1 further comprising:

2   repeatedly performing arithmetic operations on signal values associated with different

3 regions of the data set to produce a plurality of resultant signal values;

4   determining sign bits associated with the plurality of resultant signal values; and

5   providing the sign bits as the pseudo-random number sequence.

1   3.   The method of claim 1, wherein the generating of the pseudo-random number

2 sequence comprises:

3   computing a mean signal value for a first region of the data set;

4   computing a mean signal value for a second region of the data set;

5   performing an arithmetic operation on the mean signal value of the first region and

6 the mean signal value of the second region to produce a resultant signal value;

7   determining a sign bit of the resultant signal value; and

8   providing the sign bit as a portion of the pseudo-random number sequence.

1   4.   The method of claim 3, wherein the performing of the arithmetic operation

2   includes computing a difference between the mean signal value of the first region and the

3   mean signal value of the second region.

1   5.   The method of claim 4, wherein each region of the data set includes a

2   predefined image within the frame.

1   6.   The method of claim 1, wherein the producing of the watermark includes

2   computing a data block having an amplitude for the watermark;

3   computing a secondary data set, each pixel of the secondary data set having a

4   predetermined signal value; and

5   multiplying the pseudo-random number sequence, the amplitude and the secondary

6   data set to produce the watermark.

1   7.   The method of claim 6, wherein the amplitude for the watermark is computed

2   through adjustment of a plurality of parameters including frame differences.

1   8.   A method for extracting a watermark from a video sequence, comprising:

2   receiving the video sequence having a first frame embedded with a watermark; and

3   recovering the watermark within the first frame through analysis of intensity

4   differences between the first frame of the video sequence and a second frame of the video

5   sequence.

1   9.   The method of claim 8, wherein prior to recovering the watermark, the

2   method further comprises:

3 computing a pseudo-random number sequence using the random number generator

4 seed

1 10. The method of claim 9, wherein the recovering of the watermark includes:

2 computing a sum for products of (i) differences between watermarked intensities of

3 the first frame and the second frame of the video sequence and (ii) corresponding elements

4 of the pseudo-random number sequence.

1 11. The method of claim 10, wherein the recovering of the watermark further

2 includes:

3 computing a products of (i) a mean value for the differences between watermarked

4 intensities of the first frame and the second frame of the video sequence and (ii) a sum of the

5 pseudo-random number sequence.

1 12. The method of claim 11, wherein the recovering of the watermark further

2 includes:

3 subtracting (i) the product of the mean value for the differences between watermarked

4 intensities of the first frame and the second frame of the video sequence and the sum of the

5 pseudo-random number sequence from (ii) the sum of products of the differences between

6 watermarked intensities of the first frame and the second frame of the video sequence and the

7 corresponding elements of the pseudo-random number sequence.

1 13. A method comprising:

2 receiving a portion of a watermarked sequence of data; and

3 extracting a watermark from a segment of the portion sequence of data without

4 having access to either an original sequence of data or the entire watermarked sequence of

5 data.

1 14.   The method of claim 13, wherein the sequence of data includes a video
2 sequence.

3 15.   The method of claim 13, wherein the portion of the sequence of data includes
4 at least one frame of video.